UNMANNED AERIAL VEHICLE REQUIREMENTS MEETING

Expeditionary Force Development Center

Marine Corps Combat Development Command

18 December 2002

Background

- **MCCDC presented the UAV "way ahead" brief to the MROC on 12 Feb 2002**
  - "Three Tier Plan"
- **No published conceptual documents address how the tiers apply to MAGTF operations**
- **BGen Glueck directed EFDC to write a UAV CONOPS during July 02**
  - All UAV Advocates took part in the effort
  - Document is currently in "Draft" form until Tier 2 and 3 issues can be resolved

Current 3-Tier UAV Strategy

Tier 3…110 NM
- VTUAV ORD

Tier 2…27 NM
- CR ORD

Tier 1…2.7 NM
- ISURSS ORD

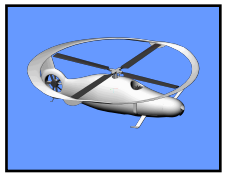
Shadow

Pioneer

FireScout

Future UAV

FSCL (MEF)


Dragon Warrior

Dragon Eye

FLOT

Tier 1- Small Unit

m Small Unit Remote Scouting System C

- Approved 3 Mar 2000
- **Primary Mission**: reconnaissance and surveillance
- **Purpose**: provide organic UAV capability to small unit commanders
- Employed in the Battalion using existing force structure
- MCWL is currently developing ar Dragon Eye
- **Range**: 2.7 NM
- **Endurance**: 30 Min
- **Payload**: 1 lb
- **System cost estimates**: $15-30K

Dragon Eye

Tier 2- Close Range

Close Range ORD

Dragon Warrior

- Approved 7 Jun 1995
- **Mission**: Regiments and MEU's:
  - Target Acquisition & Designation
  - Reconnaissance and Surveillance
  - BDA
  - Radio Relay
- **Purpose**: to provide Tactical UAV to a modest forward (afloat or ashore) expeditionary force
- Dragon Warrior UAV currently being built by NRL and MCWL
- **Range**: 27 NM
- **Endurance**: 3 hours
- **Payload**: 25 lbs
- OMFTS limited by range
- **System cost estimates**: $2.5M

Tier 3- Operational Level

- Vertical T/O and Landing UAV ORD approved December 1998
- Pioneer PIP approved by MROC
- **Mission**: MEF/MEB
  - Target Acquisition & Designation
  - Reconnaissance and Surveillance, Radio Relay
- **Purpose**: provide commanders with real time imagery, both Electro-Optical (EO) and Infra R from a multi-mission payload tha includes a laser designation capa
- **Range**: 110 NM
- **Payload**: 90-200 lbs
- **System cost estimates**: $6M(Pioneer PIP)

Pioneer

Three Tier Plan Concerns

- **Can the Marine Corps afford three tiers?**
  - No money currently POM'ed for the MEU/Regimental level UAV (Tier 2)
- **No Force Structure allocated for the MEU/Regimental level UAV**
  - VMU's cannot support both a Tier 2 and Tier 3 UAV structure with current manning
- **Installation and Logistics Issues**
- **Training Issues**

Three Tier Plan Concerns

- **Shipboard Capable?**
  - VTOL
  - Expeditionary
  - Support deployed MEU’s

Is The Three Tier Requirement Valid??

- **Option #1: Re-Validate three tier requirement**
- **Option #2: Validate a two tier requirement**
  - Current Tier 1 and Tier 2 (Battalion & MEU/Regiment)
- **Option #3: Validate a two tier requirement**
  - Current Tier 1 and Tier 3 (Battalion and MEF/MEB)
  - MEU/Regiments equipped with Portable Ground Control Stations / Remote Receive Stations for control and imagery receipt

Other Service UAV Programs

- **Army**: Shadow 200 Program
  - Tier 2/3 capability
  - Limited range, endurance and payload
- **Navy**: no Tactical UAV capability
  - Focus on Global Hawk / Broad Area Maritime Surveillance
  - Unmanned Combat Air Vehicle (UCAV) capability by 2015
- **Air Force**: Predator B and Global Hawk
  - large, landbased UAV's

Proposed Way Ahead

- Validate two tier requirement
- Continue to refine the Marine Corps Tactical UAV requirement

Conclusion

- EFDC will address advocate concerns about UAV requirements.
- UAV CONOPS to LtGen Hanlon for signature

Back-up Slides

MROC Approved : 18 Dec 02

- **UAV 3-Tier Strategy (SURSS, CR, SR/TUAV)**
- **Retain Shipboard Tier-3 UAV "capability"**
  - Continue LHA/D UCARS funding in Navy POM04
- **Road Ahead**
  - Fund SURSS in USMC POM04
  - Proceed w/ Marine Shadow in NavAir POM 04
  - Obtain CR UAV RDT&E in POM04, WPN POM06
  - N78 Navy/USMC TUAV Study for 2010 & beyond
    - Investigate canard wing / advanced technologies
  - Revalidate Reqmts/ORDs for POM06 SR/TUAV
- **MROC to address UAV Advocate / Proponent Issues**

UAV Operational Requirements Document (ORD) Summary

- **Capabilities reflect those listed in ORDs**
- **Actual airframe performance varies depending on stage of development**
- **Threshold values are minimum required capability**
- **Objective ranges reflect operationally ideal capability**
- **Pioneer is the only operational UAV in the Navy and Marine Corps inventory**
- **Predator is operational with the Air Force now**
- **HFE = Heavy Fuel Engine**
- **BPM= Battery Powered Motor**

500nm

405nm

250nm

110nm

80nm

25nm

5nm

Medium Range UAV - Predator

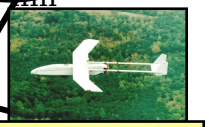
ORD (in Development)

Range: Thresh 400 nm/Obj 500 nm
Airspeed: Not indicated
Endurance: 24 hrs
Power: Not indicated
Payload: EO/IR/SAR
L & R: Thresh 8000ft x 125ft airfield/
Obj 3000ft x 50ft Airfield

Predator

UAV ORD (Draft) - Shadow 600

Range: Thresh 160 nm/Obj 405 nm
Airspeed: 75 kts (loiter)
Endurance: Thresh/Obj 8 hrs
Power: Thresh/Obj HFE
Payload: EO/IR/LRF
L & R: 2000ft x 200ft Field Site



Shadow 600 (TUAV)

Pioneer (actual performance data)

Range: 100 nm
Airspeed: 65 kts(Cruise)
Endurance: 5 hrs
Power: HFE
Payload: EO/IR
L & R: Pneumatic ramp/Rocket & runway/arrest net

Pioneer

FireScout (VTUAV)

VTUAV ORD - FireScout

Range: Thresh 110 nm/Obj 250 nm
Airspeed: Thresh 135 kts/Obj 200 kts
Endurance: Thresh 3 hrs/Obj 5 hrs
Fuel/Power: Thresh AVGAS/Obj AVGAS & MO
Payload: EO/IR/laser designator
L & R: All ar capable ships

TRSS ORD Mod - Dragon Eye

Range: Thresh 2.5 nm/Obj 5 nm
Airspeed: Not indicated
Endurance: Not indicated
Fuel/Power: BPM
Payload: EO/IR
L & R: Field Site

Dragon Warrior

Close Range (CR) UAV ORD

Dragon Warrior

Range: 50 nm
Airspeed: 60-70 kts (loiter)
Endurance: Thresh 3 hrs/ Obj 4 hrs
Fuel/Power: AVGAS
Payload: EO/IR/data relay
L & R: Field Site

Dragon Eye

COA #1
Three Tier Plan

Pros

- Satisfies long-standing operational concepts in expeditionary environment
- Multiple vehicles supporting various levels of MAGTF operations

Cons

- Most costly option
- lack of funding for 3 Tiers
- Force Structure Issues for 2nd Tier
- Installation and Logistics issues for 2nd Tier

COA #2
BN and MEU/RGMT Requirement

Pros

- Small, shipboard compatible UAV owned/operated by MAGTF Commander
- Over the horizon capability
- Supports EMW in Ship to Objective Maneuver (STOM) (50 KM)

Cons

- Only 50 KM capability
- No Tactical Control Stations on Naval ships only funded for TCS Level 1 (data receipt only) in PR03
- Restructure existing VMU's

COA #3
BN and MEF/MEB Requirement

Pros

- MEF Commander controls and operates his UAV's
- MEU's/Regiments rely on man-portable Ground Control Stations and/or remote receive stations for imagery
- Minimal (if any) Force Structure issues

Cons

- MEU/Regimental Commanders do not own their own UAV

Dragon Eye

- Dragon Eye is a rapid acquisition program funded by MCWL and ONR, built by NRL, managed by MCWL, and is a direct result of SECNAV's "Small UAV Initiative".
- Program is "green dollar" with target costs of $15-30K per airframe
- Primary Mission is reconnaissance and surveillance for the small unit commander
- 5 lb modular system capable of fully autonomous flight
- 14 lb ground control station with target cost of $10-15K.
- Designed to disassemble into 5 separate pieces to be transported inside an individual Marine's Alice pack
- Hand launched
- Flies a pre-assigned GPS waypoint route and has the ability to

Dragon Warrior

- Dragon Warrior is designed to fill the void between Tier 1 and
  Tier 3 UAV's for a forward deployed afloat expeditionary force
- Primary mission is Reconnaissance and Surveillance, Precision
  Targeting, BDA and communications relay
- 310 lb (wet) VTOL system capable of fully autonomous flight
- Capable of speeds up to 110kts and endurance time of 5 hrs
- Entire system can be transported in a single HMMWV
- Flies a pre-assigned GPS waypoint route and has

Current Pioneer UAV

- Currently DoN owns 45 pioneers
- Marine Corps VMU's have 10 vehicles
  (5 each VMU-1 and VMU-2)
- Pioneer Training Unit has 7 vehicles
- VC-6 (Navy) is standing down
- 28 vehicles are Attrition/Pipeline

Aircraft

ISURSS Requirements

- Operating radius of 5 km
- 0.5 hours of endurance
- Ceiling of 1000 ft AGL
- Hand launched capability

CR ORD Requirements

- Close range ORD
- Operating radius of 50 km
- 3 hours of endurance
- Ceiling of 13,000’ MSL

VTUAV ORD Requirements

- Vertical Takeoff and Landing UAV ORD
- Operating radius of 110 km
- 3 hours of endurance
- Ceiling of 20,000 ft MSL
- Payload Weight of 200 lbs